

**CLAIMS**

1. A probe for use on a coordinate positioning apparatus comprising:
  - 5 a housing attachable to an arm of the coordinate positioning apparatus and a stylus mounted on a stylus support member, said stylus having a tip, and said stylus and stylus support member being deflectable with respect to the housing;
  - 10 a first transducer system which measures movement of the stylus support member relative to the arm of the coordinate positioning apparatus;  
a second transducer system which measures movement of the tip of the stylus relative to the stylus supporting member;
  - 15 a tip position calculator which combines outputs from the first and second transducer systems to provide a measurement of total stylus deflection.
- 20 2. A probe according to claim 1 wherein the first transducer system measures movement of the stylus support member relative to the arm of the coordinate positioning apparatus in at least three dimensions.
- 25 3. A probe according to any preceding claim wherein the first transducer system measures transverse movement of the stylus support member relative to the arm of the coordinate positioning apparatus.
- 30 4. A probe according to any preceding claim wherein the first transducer system has a range of less than 5mm.
5. A probe according to any preceding claim wherein

the second transducer system measures movement of the tip of the stylus relative to the stylus supporting member in two dimensions.

5 6. A probe according to any preceding claim wherein the second transducer system has a higher mechanical response than the first transducer system.

7. A probe according to any preceding claim wherein  
10 the mechanical response of the second transducer system is at least five times higher than the mechanical response of the first transducer system.

8. A probe according to any preceding claim wherein  
15 the second transducer system comprises at least one strain gauge.

9. A probe according to claim 8 wherein the at least one strain gauge comprises three strain gauges spaced  
20 at 120° about the longitudinal axis of the stylus.

10. A probe according to any preceding claim wherein the secondary transducer system is mounted on the stylus support member.  
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11. A probe according to claim 10 wherein the stylus support member is provided with deformable bridges onto which the secondary transducer system is mounted.

30 12. A probe according to any of claims 1-9 wherein the secondary transducer system is mounted on the stylus.

13. A probe according to claim 12 wherein the second transducer system is located near the tip of the

stylus.

14. A probe according to either of claims 12 or 13  
wherein the stylus is provided with a deformable tube  
5 onto which the secondary transducer system is mounted.

15. A probe according to any preceding claim wherein  
the secondary transducer system comprises at least one  
transducer mounted on the stylus support member and at  
10 least one transducer mounted on the stylus and wherein  
readings from the at least two transducers are combined  
to provide the data from the secondary transducer  
system.

15 16. A probe according to any preceding claim wherein  
the secondary transducer system is one of an optical,  
capacitance or inductance transducer.

17. A probe for use on a coordinate positioning  
20 apparatus comprising:

a housing attachable to an arm of the coordinate  
positioning apparatus and a stylus having a stylus tip,  
said stylus being deflectable with respect to the  
housing;

25 a first transducer system which measures movement  
of the stylus relative to the arm of the coordinate  
positioning apparatus;

a second transducer system which measures movement  
of the tip of the stylus relative to the first  
30 transducer system;

a tip position calculator which combines outputs from  
the first and second transducer systems to provide a  
measurement of total stylus deflection.

18. A method of measuring a surface of an object with a probe, said probe comprising a housing and a stylus mounted on a stylus support member, said stylus having a stylus tip, and said stylus and stylus support member  
5 being deflectable with respect to the housing, the method comprising the steps of:

mounting the probe on an arm of a coordinate positioning apparatus;

positioning the probe so that the stylus is in  
10 contact with the surface to be measured and moving the probe along said surface with the stylus remaining in contact with said surface;

obtaining data from a first transducer system which measures movement of the stylus supporting member  
15 relative to the arm of the coordinate positioning apparatus;

obtaining data from a second transducer system which measures movement of the tip of the stylus relative to the stylus supporting member;

20 and combining the data from the first and second transducer systems to produce a measurement of total probe deflection.